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EXAMINER

WHITESSELL GORDON, STEVEN H

ART UNIT	PAPER NUMBER
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2882

NOTIFICATION DATE	DELIVERY MODE
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01/27/2011

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary

Application No.

10/598,481

Applicant(s)

WEDOWSKI ET AL.

Examiner

Steven H. Whitesell-Gordon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 November 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,71-76,78-80 and 82-91 is/are pending in the application.
- 4a) Of the above claim(s) 82-91 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,71-76 and 78-80 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date. _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Acknowledgement is made of Applicant's submission of English language translation of the US Provisional Application No. 60/550,302. However, According to CFR 37 1.78 (a) (5) (iv), in order to claim benefit to the filing date of a provisional application, an English translation should be provided in the provisional application even if the provisional application is abandoned. See MPEP 608.01 (V), a portion of which is repeated below, with emphasis added:

If a provisional application is filed in a language other than English, an English translation of the non-English language provisional application and a statement that the translation is accurate must be submitted if benefit of the provisional application is claimed in a later-filed nonprovisional application (see 37 CFR 1.78(a)(5)). If the translation and statement were not previously filed in the provisional application, applicant will be notified in the nonprovisional application that claims the benefit of the provisional application and be given a period of time within which to **file the translation and statement in the provisional application**. Applicants may file the translation and statement in the provisional application even if the provisional application has become abandoned.

Status of Claims

2. Applicant identifies claims 82-91 as cancelled in the Remarks filed 11/15/2010. The claims filed 11/15/2010 indicate claims 82-91 as withdrawn. For the purposes of examining, it is understood that the claims are currently withdrawn until the claims indicate claims 82-91 as withdrawn.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claims 1, 71-76 and 78-80 are rejected under 35 U.S.C. 102(e) as being anticipated by Yakshin et al. [WO 03/032329, US national phase entry application 10/491,764, published as US 2004/0253426]**

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

For claims 1, 71, 72, Yakshin teaches a method for qualifying a reflective optical element having a free interface at which radiation is reflected, the method comprising:

measuring at various wavelengths (range shown in Fig. 17a-21a and page 13) and/or various incidence angles of the radiation a reflectance (percent reflectance left axis shown in Figs. 17a-21a) and a photoelectron current (right axis) induced by the radiation in an area of the free interface (see page 24) resulting in: (a) a reflectance

curve as a function of wavelength and/or incidence angle wherein the reflectance curve has a wavelength region of maximum reflectance and/or an incidence angle region of maximum reflectance (maximum of reflectance curve shown in Figs. 17a-21a); and (b) a photoelectron current curve as a function of wavelength and/or incidence angle wherein the photoelectron current curve has a profile within the wavelength region of maximum reflectance and/or the incidence angle region of maximum reflectance (photoelectron curve shown); and

using the profile of the photoelectron curve for determining a phase shift of a standing electromagnetic wave of incident radiation with respect to the free interface (phase shift of standing wave shown in Figs. 17b, 18b,. 19b, 20b and 21b as carbon thickness increases), or using the profile of the photoelectron curve for determining an intensity a standing electromagnetic wave of incident radiation with respect to the free interface (intensity shown at 0 on x axis as shown in Figs. 17b, 18b,. 19b, 20b and 21b), wherein the photoelectron current curve and the reflectance curve are measured at several points on the interface in order to achieve spatial resolution (several points as carbon thickness increases due to contamination growth, see Figs. 17a-21a and page 23 which describes the capping layer as a carbon layer that grows and Figs. 17a-21a show several measurements, each measurement at a point, as the carbon layer increases and the free interface changes as a result).

For claim 73, Yakshin teaches determining the slope of the profile of the photoelectron current curve at the wavelength of maximum reflectance and/or the

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incidence angle of maximum reflectance (slope is shown in Figs. 17a, 8a, 19a, 20a and 21a).

For claim 74, Yakshin teaches determining a maximum (see Fig. 13 or Fig. 17a) or minimum (see Fig. 12 or Fig. 21a) of the profile of the photoelectron current curve within the wavelength region of maximum reflectance and/or the incidence angle region of maximum reflectance, wherein the wavelength corresponding to the maximum or minimum of the profile of the photoelectron current curve is closest to the wavelength corresponding to the maximum of the reflectance curve (see Figs. 12, 13 17a and 21 a, shows comparison between minimum and maximum photoelectron current to maximum reflectance).

For claim 75, Yakshin teaches the radiation is EUV radiation ($\sim 13\text{nm}$).

For claims 76, Yakshin teaches the wavelength region of maximum reflectance or the incidence angle region of maximum reflectance is from -3% to 1% of the wavelength of maximum reflectance or the incidence angle of maximum reflectance (region of maximum reflectance shown in Figs. 17a-21b).

For claim 78, Yakshin teaches a method for qualifying a reflective optical element that includes a multilayer system having a free interface at which radiation is reflected and/or a cap layer system and having a free interface at which radiation is reflected, the method comprising:

(i) measuring at various wavelengths (range shown in Fig. 17a-21b and page 13) and/or incidence angles of the radiation a reflectance (percent reflectance left axis

shown in Fig. 17a-21a) and a photoelectron current (right axis) induced by the radiation in an area of the free interface (see page 24) resulting in: (a) a first reflectance curve as a function of wavelength and/or incidence angle wherein the first reflectance curve has a wavelength region of maximum reflectance and/or an incidence angle region of maximum reflectance (maximum of reflectance curve shown in Figs. 17a-21a); and (b) a first photoelectron current curve as a function of wavelength and/or incidence angle wherein the first photoelectron current curve has a profile within the wavelength region of maximum reflectance and/or the incidence angle region of maximum reflectance (one of photoelectron curves shown in Figs. 17a-21a);

(ii) comparing the first reflectance curve and/or the first profile with a second reflectance curve and/or a second photoelectron current curve, wherein the second reflectance curve and/or the second photoelectron current curve (maximum reflection compared to photoelectron curves shown in Figs. 17a-21a) is obtained by a simulation for a given thickness of the layers of the multilayer system and/or a given thickness of the layers of the cap layer system (carbon layer thickness shown in figs 17b-21b), the second photoelectron current curve having a second profile; and

(iii) if the first reflectance curve and/or the first profile do not approximately coincide with the second reflectance curve and/or the second profile (see photoelectron curve profiles of Figs. 17a-21a), repeating (ii) with a different thickness of the layers of the multilayer system and/or a different thickness of the layers of the cap layer system,

wherein:

the method determines a thickness profile of the multilayer system and/or the cap layer system of the optical element (see carbon thickness increases in Figs. 17b-21b); and

the photoelectron current curve and the reflectance curve are measured at several points on the interface in order to achieve spatial resolution (several points as carbon thickness increases due to contamination growth, see Figs. 17a-21a and page 23 which describes the capping layer as a carbon layer that grows and Figs. 17a-21a show several measurements, each measurement at a point, as the carbon layer increases and the free interface changes as a result).

For claim 79, Yakshin teaches the radiation is EUV radiation (wavelength ~13nm).

For claim 80, Yakshin teaches that in (ii) the first profile and/or the first reflectance curve are compared with reference data measured at a reflective optical element with a multilayer system and a cap layer system of known thickness instead of comparing with a second reflectance curve and/or a second photoelectron curve obtained by simulation (see Figs. 17a-21a).

Response to Arguments

5. Applicant's arguments filed 11/15/2010 have been fully considered but they are not persuasive.

6. In response to Applicant's argument on page 7, regarding claims 1 and 77, that Yakshin does not teach making measurements at several points on that particular interface. The Examiner respectfully disagrees.

Yakshin teaches on page 23 that Figs. 16-21b show capping layer as a carbon layer, that forms the free interface layer, grows and Figs. 17a-21a show the changing of the thickness of the capping layer, thereby changing the location of the free interface. Figs. 17a-21a show that the measurements of the photoelectron curve and the reflectance curve are measured several times as the capping layer grows, thereby providing a point for each measurement. Each time the surface layer is measured, it is spatially resolved because the thickness is observed. Accordingly, Yakshin teaches that as the capping layer grows, the photoelectron curve and the reflectance curve are measured at several points during the growth, each measurement providing a spatial resolution of the interface layer.

In response to Applicant's argument on pages 7 and 8, regarding claims 1, 71-76 and 78-80, that it would not have been obvious to modify Yakshin to provide the subject matter of claims 1, 71-76 and 78-80. The rejection of claims 1, 71-76 and 78-80 are not based on obviousness.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. Whitesell-Gordon whose telephone number is (571) 270-3942. The examiner can normally be reached on Monday to Thursday, 9:00 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/S. H. W./
Examiner, Art Unit 2882

/Hung Henry Nguyen/
Primary Examiner of Art Unit 2882